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Tacoma, WA 98431

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Health care for patients over the age of 65 is vital in today's world. Determining whether programs affect these patients' resource utilization, such as clinic visits, hospitalizations, and Emergency Room visits, will help to provide better care for them. A retrospective study of patients over 65 was conducted in two phases. Phase I examined Clinical Practice Guidelines from an administrative viewpoint for a sample of diabetics over 65. Clinical Practice Guidelines (CPGs) were developed by clinical researchers to assist disease management by using written algorithms. Phase II examined a Patient Prescription Exercise program developed by a family practice physician within Madigan Army Medical Center.

Phase I outcomes showed that if a patient is well managed the number of unscheduled health care encounters is significantly reduced ($p=.02$). Additionally, chances of them having an unscheduled encounter at all is significantly reduced ($p=.017$). Phase II outcomes showed that if a patient is enrolled in a patient prescription exercise program their total number of clinic visits was reduced ($p=.001$). Moreover, their number of total encounters are significantly reduced ($p=.002$).

Conclusions drawn from this study show that implementation of Clinical Practice Guidelines, and a Patient Prescription Exercise program can significantly reduce the total resources used by participating patients.

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Clinical Outcomes and Resource Utilization of Well Managed Diabetics in the Military Medical Care System

Captain Robert Lenza

U.S. Army - Baylor University

Graduate Program in Health Care Administration

Submitted in partial fulfillment of the requirements for the Degree of Master of Health care Administration at U.S. Army - Baylor University Graduate Program in Health Care Administration

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Abstract

Health care for patients over the age of 65 is vital in today's world. Determining whether programs affect these patients' resource utilization, such as clinic visits, hospitalizations, and Emergency Room visits, will help to provide better care for them. A retrospective study of patients over 65 was conducted in two phases. Phase I examined Clinical Practice Guidelines from an administrative viewpoint for a sample of diabetics over 65. Clinical Practice Guidelines (CPGs) were developed by clinical researchers to assist disease management by using written algorithms. Phase II examined a Patient Prescription Exercise program developed by a family practice physician within Madigan Army Medical Center.

Phase I outcomes showed that if a patient is well managed the number of unscheduled health care encounters is significantly reduced ($p=.02$). Additionally, chances of them having an unscheduled encounter at all is significantly reduced ($p=.017$). Phase II outcomes showed that if a patient is enrolled in a patient prescription exercise program their total number of clinic visits was reduced ($p=.001$). Moreover, their number of total encounters are significantly reduced ($p=.002$).

Conclusions drawn from this study show that implementation of Clinical Practice Guidelines, and a Patient Prescription Exercise program can significantly reduce the total resources used by participating patients.

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Clinical Outcomes and Resource Utilization of Well Managed Diabetics in the Military Medical Care System.

1. Introduction

a. Conditions which prompted the study

> "[Currently] 15.7 million Americans -- 5.9 percent of the population, have diabetes mellitus. Total diabetes related costs in 1997 [were] nearly 100 billion dollars, or about 14 percent of health care expenditures in the United States… Despite the high prevalence and even higher direct and indirect economic costs of diabetes, there is now incontrovertible scientific evidence that effective antihyperglycemic, antihypertensive, and hypolipidemic treatment produce substantial outcomes benefit" (VHA/DOD Guideline, 2000).
>
> Diabetes is defined as "a chronic metabolic disorder in which utilization of carbohydrate is impaired and that of lipid and protein enhanced; it is caused by an absolute or relative deficiency of insulin and is characterized, in more severe cases, by chronic hyperglycemia, glycosuria, water and electrolyte loss, ketoacidosis, and coma" (Stedman, 2000).

Clinical Guidelines Improve Outcomes

Medical professionals desire positive clinical outcomes. One possible method would be to use clinical practice guidelines

to improve patient care. The belief is that if patients present with similar problems, have similar disease stages, and are treated with the same medications/treatment regimens, they should have similar clinical outcomes.

Based on this hypothesis, clinical practice guidelines (CPGs) were developed by clinical researchers. Clinical practice guidelines assist disease management by using written algorithms. They are in existence due to the diligence of health care providers who have spent many years studying treatment regimens that work best for certain types of patients. The impetus being an outcome based guide that allows primary care physicians to treat certain diseases, and allow specialty physicians to work with the patients that truly need their unique abilities and talents. A secondary benefit CPGs serve is to help distinguish complex from less complex cases.

Guidelines for Diabetic Care May Improve Outcomes

Diabetics are chronic sufferers who can usually manage a large portion of their own health care. Diabetic patients usually can do this in a number of ways. The most common management technique is regulating diet or, in the more severe cases, using insulin. Today, to think of a diabetic administering an insulin injection would not shock the population at large. Portrayals on television, books, etc. have allowed us to realize that diabetes is a chronic disease that requires long term treatment with a majority of the treatment done by the patient. With the initiation of managed care, the push to take this one step further has raised the question, why

not have a primary care physician, instead of a specialist, treat these patients if their disease is so common?

Within the military managed care system, the next logical and prudent step would be to prove that not only does a CPG allow positive clinical outcomes when implemented by a primary care physician, but it allows resource utilization to be optimized. From this, the health care industry could determine if CPGs are indeed saving money. When combined, positive clinical outcomes and less system utilization will make for a healthier patient at less cost. That said, providers could then resolve the question of whether instituting a diabetic CPG would provide positive outcomes, and provide better resource utilization. To do this each facility must optimize the patient experience and ensure that diabetics are well managed.

So, if it is established that diabetic patients are indeed well managed, having positive clinical outcomes, and utilizing reasonable resources, can their health be further improved? Is there more that can be done? The next step would be preventive health measures. Preventive health measures are a proactive step providers suggest to improve a diabetic's health. If the population is analyzed, it is obvious that there is a need to explore diabetic management, with regards to preventive health care, more closely.

Managing the Health Care of Senior Diabetics

The aging of the population is clearly one of the more important health care challenges health care providers currently face, and will continue to face in the future. With the large

number of "baby boomers" moving into the ranks of the "senior" cohort (http://www.ameristat.org/estproj/aging.htm, 2000), providers will be expending many resources to care for the well being of this population. Within the health care industry, providers have already come to realize that, in order to conserve limited health care dollars, they must keep this section of our population healthy. Outcomes from preventive health measures have clearly demonstrated that keeping people in a desired state of health will keep them from overusing health care resources. The question that usually goes unasked is "by how much?"

The Department of Defense (DOD) is charged with the care of their eligible beneficiaries. This is provided through the TRICARE benefit program. "TRICARE is a regionally managed health care program for active duty and retired members of the uniformed services, their families, and survivors. TRICARE brings together the health care resources of the Army, Navy and Air Force and supplements them with networks of civilian health care professionals to provide better access and high quality service while maintaining the capability to support military operations"(http://www.tricare.osd.mil/tricare/beneficiary/whatistricare.html, 2000).

With the introduction of the TRICARE Senior Prime (TSP) demonstration project, the military health care system (MHS) took on the added responsibility to enroll patients over 65 and provide them a full spectrum of care instead of space available care which had been the normal practice. TRICARE Senior Prime is

defined as "a managed care demonstration program designed to better serve the medical needs of military retirees, dependents, and survivors who are 65 and over…[the] demonstration program… provides enrollees with all of the benefits available under Medicare, plus additional benefits under TRICARE Prime that are offered to other eligible retired military beneficiaries under age 65." (http://www.tricare.-osd.mil/tricare/beneficiary/SeniorPrime.html, 2001)

The impetus behind this idea is that if the TRICARE Senior Prime demonstration project proved to be successful, the military health care system will be altered to include many people who have not fallen into the MHS area of responsibility, except on a space available basis, since the military managed care system was initiated. This said, the MHS leadership is charged with finding a way to effectively and efficiently treat and care for this population.

Recently, congress approved a benefit for military retirees and their beneficiaries that is being called "TRICARE For Life". Whereas, the TSP demonstration program was only a demonstration, TRICARE for life is a law, as mandated by congress in the National Defense Authorization Act of 2001. Beginning in Fiscal Year 2002, TRICARE for life will officially replace TSP. TRICARE benefits will no longer be lost when retirees become eligible for Medicare.

With the introduction of managed care, health care has shifted its paradigm. Health care professionals no longer want to keep hospitals full of patients, nor do patients want to stay

in the hospital. Therefore, the shift from inpatient to outpatient care was a natural one. This has, however, created an expectation on the part of the managed care industry that only the most severe cases are hospitalized. So, what does this mean? In order to keep health care expenditures from over powering the national budget, the health care industry has to find a way to keep patients out of the hospital unless necessary. Although this has widely been portrayed as a negative aspect of health care, it has spawned many positive systematic changes. A strong emphasis on preventive health was one result. The idea is that if the health care industry can keep patients healthier, they will not require as much care, and therefore will not utilize the system as often as they would have if not for these preventive health measures. If preventive health management is done appropriately, it will achieve the goal of not only keeping patients away from the need to use the health care system, the health care industry will achieve the desired results of cost savings that managed care was originally developed to do.

Pulling these pieces together and implementing managed care principles has been a challenge for the Military Health System. Under managed care guidelines, the MHS is looking for better ways to control costs. Keeping our military beneficiary population healthier can contribute to lowering costs. The addition of the eligible senior population puts another wrinkle in the systematic demands placed on the military managed care system. As patients age, they generally suffer multiple chronic health problems, as compared to the acute conditions faced by

younger patients. If the health care system can institute a program that can help the senior population achieve a healthier state, it would improve overall patient health while reducing costs.

b. Statement of the problem

Will a well-managed diabetic patient have better clinical outcomes and use fewer resources?

c. Literature Review

When health care is examined, clinical outcomes and costs of care are commonly delineated. The clinical outcomes are the most important, because this is why the health care industry exists, to improve patient health. The patient is the most important member of the health care team. The goal of the health care team is to ensure that the patient is the healthiest he/she can be. The next most important issue looked at is typically the resources used by the patient. The price of health care in the United States is going up every year. Predictions say that health care costs will rise to 18% of the Gross Domestic Product during the 20th century unless something is done to contain costs (Sultz, Young, 1999). Managed care practices are put into place to ensure providers and staffs are providing optimal care for patients. To measure this, we must look at how we are doing business, and make sure the processes are sound. We must look at an intervention, in this case use of a Clinical Practice Guideline, to see if it is doing what it is designed to do. The

effectiveness of this intervention should produce a measurable benefit to the patient and the institution (Power, Eisenberg, 1998). Unfortunately, there has not been much research demonstrating the effectiveness of CPGs. This is clearly one important reason why a study of this kind must be done. If the health care team wishes to optimize the health care system and thereby improve the patient experience, all aspects of a CPG must be examined.

There is an ongoing argument about the feasibility or usefulness of clinical practice guidelines. Most physicians would agree that practice guidelines are a good idea in theory. Unfortunately, although they understand this intuitively, they do not always implement the guidelines in their daily treatment of patients (Stross, 1999).

Clinical practice guidelines are defined as "a formal statement about a defined task or function in clinical practice, such as desirable diagnostic tests or the optimal treatment regimen for a specific diagnosis: generally based on the best available evidence; e.g., randomized control trials that have been assessed by a Cochrane collaborating group" (Stedman, 2000).

Thus far, forcing providers to utilize clinical practice guidelines has not been done successfully. There are many reasons why this has not occurred. However, there are ongoing efforts to change this (Stross, 1999). If the health care industry could apply the research done to date, the improvement in clinical outcomes and resource utilization would be

staggering. Disease management along with CPGs will allow the health care industry to focus on both sides of the disease. If we first look at preventing the disease, or major symptoms associated with the disease, the resources used should be limited. This would allow us to focus on the other side, and optimize the amount of resources available for acute symptoms associated with the disease (Rohrbach, 1999).

Implementing CPGs is an ongoing effort. Although it may be difficult to get providers to use CPGs, CPGs will most likely be standard practice at most hospitals. The method health care leaders will probably employ, to get providers to use CPGs, is to do a retrospective evaluation of treatment given by providers. From this evaluation, they will be able to determine if providers are using CPGs. The problem that must be solved is to show providers that this is the right thing to do, and get them to believe it. However, as stated earlier, this is not always easy. The MHS does, however, have a more systematic way of implementing CPGs. Their approach is directive in nature. The MHS has the luxury of mandating CPGs and measuring whether they are followed. This does not guarantee CPGs will be used, but, hopefully, this will help to prove that CPGs are effective, once outcomes are followed over time. One study has shown that even in the MHS, alternative methods of implementing CPGs are encouraged. The result was an empowered provider producing a healthier patient (Mitchell, 2000).

Clinical practice guidelines are useful in many areas of Diabetes disease management. They have proven to be useful not

only in treating the disease as a whole, but within subgroups as well. Clinical practice guidelines have been developed to target specific treatments for diabetes. One such specific target was a diabetics diet. A cost-effectiveness study of a nutrition therapy for non-insulin dependent diabetes mellitus (NIDDM) showed a significant improvement in the outcomes of the patients. The study showed that clinical outcomes as well as resource utilization for each patient was improved with the intervention. Using their cost-effectiveness ratio, patient costs for nutrition care turned out to be $4.20 for patients in the clinical guidelines group, compared to $5.32 for patients that were treated in the basic nutrition care group. The total savings per patient after the implementation were $1.12 for their daily nutrition care (Franz, et al, 1995).

Producing a CPG that is efficient and efficacious is reason enough to institute it. Evidenced-based practices should be one of the driving factors that will lead to better health care in the future. The problems identified with diabetes are numerous. They include possible blindness, foot amputation, and kidney disease. The price to the patient can be destructive not only emotionally but also financially, and may ultimately result in death. Diabetes is a disease that does not discriminate. It affects young and old alike. The resulting effects on the population, as a whole, can be devastating (Meltzer, 1998).

In the managed care setting not only are the outcomes important, but the management of the resources that are associated with the disease are very important. The object of an

ethical health care industry would be to combine the two. The ideal clinical practice guideline would not only ensure positive patient outcomes, but would also reduce unnecessary resource utilization. The literature shows that studies have been done with regard to CPG effectiveness. The majority of studies concentrate on positive patient outcomes, for obvious reasons. It seems only logical the next step would be to evaluate the strength of the CPG in reducing resource utilization. Clinical practice guidelines establish a specific order for intervention. Although this has been referred to as "cook book" medicine, the outcomes associated with using CPGs are positive. So, an order of proceeding for the physician is already established. Diagnosing the disease, performing the intervention, and measuring the outcome is the basic method. If this is done correctly, patients should experience a positive outcome. This has been done in a few studies. When a group of physicians wanted to see if a CPG could produce a positive outcome for a chronic disease, they chose a common affliction to women. Acute uncomplicated urinary tract infection (UTI) is a common disease today with high associated costs. The aim of the UTI study was to follow the CPG and identify if indeed the patient experienced better outcomes while reducing unnecessary utilization of resources. The results were as expected. The study showed that if the physicians followed the CPG, the patients did not use unnecessary resources. The number of urinalyses, urine cultures, and office visits decreased. By following the CPG, physicians were able to diagnose correctly

and prescribe the correct antibiotic for the problem. This shows a decreased use, and therefore decreased cost can be determined. To further strengthen the argument for CPGs, outcomes were compared to a clinically similar group of patients treated without CPGs, with no difference in outcomes identified. The conclusion was that cost savings is indeed possible without adversely affecting patient outcomes (Saint, 1999).

Pharmaceutical costs are another cost associated with treating disease. It seems common sense to use the proper medication for each disease. Another positive use of CPGs is that they can include the most appropriate medication that produces the best outcomes for disease. Under old practices, providers use the medications they wish to treat a disease. The major complaint by the managed care industry is that most providers utilize newer medications, which most of the time translates to more expensive medications. Unfortunately, a new medication does not always translate to better outcomes. Clinical practice guidelines allow providers to use the medication with the best outcome. In a study designed to see if CPGs along with intensive education would reduce costs for pharmaceuticals in treating hypertension, the results showed it did. "Use of guidelines was associated with decreased costs for antihypertensive medications…There was no increased use in other measured resources…including the number of outpatient laboratory services obtained, clinic visits, emergency room visits, or hospitalizations" (Aucott et al, 1996).

Clearly, there is a link between reducing the need for

medical care and reduction of costs. Managing a patient well and preventive medicine go hand in hand. Proper patient management, at its very heart, means doing what is right for the patient. The message that should be received by providers should be one of keeping patients in the best possible health for their illness. This will result in reduced demand for services. If services are not used, costs are not generated (Fries et al, 1993).

As stated earlier, preventive medicine is one way to optimize a patient's health. When looking at a diabetic population, exercise and diet are the two most common interventions (Araki, Ito, 1999).

To understand the feasibility of undertaking a prescription exercise program for a senior diabetic population, the history of such interventions was explored. Seniors are one of the most targeted health care groups. Health care providers are especially interested in them due to their growing numbers and the recent increased government oversight of the Medicare program (http://www.ameristat.org/estproj/aging.htm, 2000).

There are already many studies completed on seniors' health interventions. In today's mature managed care environment, finding ways to trim health care costs is becoming more difficult. With personnel and resource shortages, preventive health is becoming the focus for providing the most benefit to the health care institution, as well as the patient. Studies around the world have proven that a preventive health intervention for chronically sick patients can lower patient

utilization of the health care system (Shephard, 1993). The interest of creating a healthier patient, and therefore a more appropriate user of the system, is in the forefront of all intervention programs (Munro, Brazier, Davey, Nicholl, 1997). However, there are many obstacles in developing and evaluating these intervention programs. For example, how can you measure what a healthier patient is, and once you do that, what are the benefits of this program, both from the perspective of the patient and the health care system. After all, anyone starting a prescribed exercise program will incur costs associated with facilities, supplies, and personnel. These costs are assumed to be off set by accomplishment of desired outcomes in a well-designed exercise program. Putting together a program that will keep the participants out of the health care system will, by default, lower utilization and therefore costs (Shephard, 1993).

When determining if a system should undertake a new program analyzing utilization patterns of a population and probing to determine if that population reaps benefits is the most crucial point. Literature review shows that, in many cases, there is a definite benefit to the patient as well as to the institution (Lorig, Mazonson, Holman, 1993).

Patient satisfaction and quality of life (QOL) are two commonly identified benefits. There are many ways to see if the patient is satisfied with the program. Quality of life measures are typically used to gauge the success or failure of a new program for seniors (Belardinelli, Georgiou, Cianci, Purcaro, 1999). Since most senior populations targeted for prevention

interventions have a pre-existing chronic illness, curing the patient is usually not the focus of the intervention. As QOL measures are sensitive to changes in health status of individuals with chronic illnesses, quality of life is the most frequently used metric to determine the success or failure of a program or intervention. Patient self-reported changes in health are used with this method of measuring success or failure. If a patient perceives they are getting better they usually will say the intervention was a success. This is usually the yardstick when determining the success of programs for seniors. Less subjective methods are also utilized to measure individual patient success. Range of motion and functional capacity, along with certain strength measures have been used to evaluate success in another study (Kavanagh, 1996).

When looking at the amount of research that has been done on CPGs, it is easy to see the necessity of more study. There are still two major camps on either side of the CPG issue. Clinicians today are still heard saying they are not sure of the benefits of CPGs. Studies, such as the one proposed in this project proposal, will help to answer the question of the feasibility of CPGs.

d. Purpose (Variables/Working Hypothesis)

The purpose of this study was to assist the command staff at MAMC to understand how, and if, CPGs can save time and money and improve any inefficiencies found at the hospital. Current Army Medical Department leadership has put implementation of

CPGs in the forefront for the U.S. Army Medical Command.

This study was a two-phased study. Phase I consisted of looking at the Diabetes Mellitus Clinical Practice Guideline at Madigan Army Medical Center. This phase was designed to look at the effectiveness of Clinical Practice Guidelines in an actual clinical setting. This helps medical administrators to determine the best course of action when applying necessary resources to implementing CPGs.

Phase II looked at a physician-prescribed exercise program for over 65 beneficiaries. When looking at saving costs, how much money can be saved by prevention is not predictable to 100 percent accuracy. However, looking at utilization rates of participating patients will help to show whether utilization would be effected overall.

Once utilization is determined, a dollar factor can be used to tie the implementation of the CPG/Exercise Program to perceived savings.

Clinical Practice Guidelines/Phase I

The independent variable (X) was determining if a patient is well managed. This was a binomial variable.

The dependent variables (Y_1, Y_2, Y_3, and Y_4) were the amount of resources used. Four variables were looked at to determine if the guideline is working. These were continuous variables. They were:

Y_1: Unscheduled Clinic Visits

Y_2: Unscheduled Hospitalizations

Y_3: Emergency Room Visits

Y_4: Total Encounters

A separate test was done to determine whether being well-managed helps to reduce the chances of having an encounter at all. Taking the last variable Y_4 and recoding it to be stated as a dichotomous variable created the last variable Y_5.

Y_5: Health Care Encounter (Y/N)

Normal amounts of medical procedures are associated with a diabetes diagnosis. For the purpose of this study, only those procedures not expected were examined.

Operational definitions for the dependent variables were as follows:

Resources used: The aggregate number of the dependent variables used by a patient relating to their diabetes diagnosis.

Unscheduled Clinic Visits: All patient visits not scheduled/expected by the PCM where the primary diagnosis is related to the diabetes disease.

Unscheduled Hospitalizations: All inpatient days not scheduled/expected by the PCM where the primary diagnosis is related to the diabetes disease.

Emergency Room Visits: Any visit to the emergency room that is the result of an acute illness where the primary diagnosis is related to diabetes.

Total Encounters: Total number of unscheduled clinic visits, hospitalizations, and emergency room visits.

Health care encounter (Y/N): This variable looked at whether

a patient had any of the above encounters. If they had any of the three encounters above, a yes answer was defined.

$Y=f(X)$ ∴ Resource Utilization = f(Clinical Practice Guidelines). The amount of resources used by a diabetic patient is the result of how well the provider manages them in relation to the clinical practice guideline.

The formal alternate and null hypotheses were:

H_a: Resource utilization at Madigan Army Medical Center is a function of how well a patient is managed under the Diabetes Mellitus Clinical Practice Guideline.

$H_{Ø}$: Resource utilization at Madigan Army Medical Center is not a function of how well a patient is managed under the Diabetes Mellitus Clinical Practice Guideline.

An over 65 diabetic population was followed. This population was used as a model due to the amount of gathered data. Once concluded, this model can be expanded and used for other populations.

To understand if the CPGs are being followed, we must understand what is meant by well-managed. Madigan Army Medical Center standards of care for the adult patient with Diabetes Mellitus requires the following information to be documented in their medical records:

Table 1

Primary Care Emphasis:	Y/N
Name of the primary care manager OR evidence of referral	

to Foundation Health Federal Services for assistance in finding a PCM.	
History Discussion of the role of self-monitoring of blood glucose (SMBG) documented at each visit. Notation of frequency and severity of hypoglycemia, at each visit.	Y/N
Physical exam Weight and blood pressure, at each visit. Referral to Ophthalmology for a dilated retinal exam, at a minimum annually. Foot examination monofilament screening for neuropathy, at a minimum every 6 months.	Y/N
Laboratory Hemoglobin A1c(HbA1c) or glycated hemoglobin (GHb), at a minimum annually. Annual fasting lipid profile, serum creatinine, and urinalysis (UA), at a minimum annually. Thyroid stimulating hormone (TSH), at a minimum every 3 years.	Y/N
Therapy Referral to nutrition care AND Diabetic Nurse Educator, at any time. Evidence of an adjustment to therapy if the HbA1c or GHb is greater than two percentage points (2 percent).	Y/N

Table 1 was taken directly from the MAMC CPG. It is the table referred to when doing a retrospective record review such as this one.

For the purposes of this study, a well-managed patient had documented in their medical records at least 75 percent of critical items prescribed by the clinical practice guideline. Critical items include all questions within the history heading; all questions within the physical exam heading; all questions within the laboratory heading; within the therapy heading, the question about referral to nutrition care and a diabetic educator. The poorly managed patient had these criteria missing or only partially completed. Once the management of a patient was established, a comparison of the variance in resources was done.

Prescription Exercise Program/Phase II

The independent variable (X) was the implementation of a patient prescription exercise program. This is a binary variable. All patients used in this study were included in the implementation of the program. They were broken into two categories, pre-implementation and post-implementation. For further explanations see the design method in section 2: methods and procedures.

The dependent variables (Y_1, Y_2, Y_3, and Y_4) were the amount of resources used. Four variables were looked at to determine if the exercise program was working. These were continuous variables. They were:

Y_1: Clinic Visits

Y_2: Hospitalizations

Y_3: Emergency Room Visits

Y_4: Total Encounters

Normal amounts of medical procedures are associated with a patient that is over 65 years of age. For the purpose of this study, only those procedures not expected were examined.

Operational definitions for the dependent variables are as follows:

Resources Used: The aggregate number of the dependent variables used by a patient.

Clinic visits: The number of clinic visits not associated with normal health care.

Hospitalizations: The amount of hospitalizations higher than the mean for an average patient over 65 years of age.

Emergency Room Visits: Those visits not associated with an acute trauma, which are higher than the mean for an average patient over 65 years of age.

Total Encounters: Total number of unscheduled clinic visits, hospitalizations, and emergency room visits.

$Y=f(X)$ $\therefore$ Resource Utilization = f(Prescription Exercise Program). The amount of resources used by an over 65 patient is the result of how well an individualized patient prescription program works for a population. Resources are defined as the dependent variables above.

The formal alternate and null hypotheses were:

H_a: Resource utilization at Madigan Army Medical Center is a function of whether a patient, over 65 years of age, is

enrolled in a prescription exercise program.

$H_{\emptyset}$: Resource utilization at Madigan Army Medical Center is not a function of whether a patient, over 65 years of age, is enrolled in a prescription exercise program.

2. Method and Procedures

Clinical Practice Guideline Evaluation/Phase I

Persons, Objects, Events: There were two data sets used in this analysis. They were an over 65 years of age group of diabetics seen at MAMC. A group considered well managed was compared to a group that was poorly managed. Using the same patients, their usage history before implementation of the diabetes guideline, and after implementation was examined for variance. The sample size (n) for both sets was 39 (n=39).

Clinical practice guidelines within the Department of Defense have become an important issue in recent years. The Department of Defense along with the Veterans Health Administration have developed several CPGs for numerous diseases, one of which is Diabetes Mellitus (VHA/DOD, 2000). As stated earlier, instituting CPGs in physician practice is difficult. The past Surgeon General of the U.S. Army put the implementation of CPGs on his top 20 list of important things the Army Medical Department must do (MEDCOM, 1999). This has also been documented by the current Surgeon General as item number 13 on his top 20 list. (http://www.cs.amedd.army.-mil/qmo/top20.htm, 2001) The institution of CPGs will go

forward, the key to proving they work will be to get both clinical and administrative buy-in for the guidelines.

Method

Study Site

Madigan Army Medical Center (MAMC) was the study site. The MAMC is a major military academic medical center located in the Puget Sound area of Washington State. It is the only major medical center run by the Department of Defense in this area. As a teaching hospital, MAMC has the responsibility of training future health care and administrative personnel to serve within the Military Health System. The beneficiary population for Fiscal Year 1999 consisted of 2887 diabetics being treated at MAMC. Of that number, 1032 were over 65 years of age.

Patient Information

In compiling the data, the researcher had access to personal information such as names and social security numbers as well as primary diagnoses. All materials and documents under review containing any personal information were maintained in a secure location. Disclosure of identities was not made, nor was identifiable patient information used. All cases were assigned an identification number, rendering the patient anonymous. Publication of this study did not disclose individual patient identification.

Intervention

The institution of the guidelines themselves was looked at next. For this study, the Madigan Army Medical Center clinical practice guidelines for diabetes mellitus was used; see appendix A. These guidelines were designed and implemented in October 1998. Over 2 years of data was already collected since the inception of the guidelines. A comparison of the 2 years before the program as well as the 2 years since the guideline was instituted was done.

A differentiation should be made at this point. The Department of Defense/Veterans Health Administration guidelines, which was instituted throughout the federal health care sector, has only been finalized since December 1999. Implementation of the guideline did not happen within MAMC at the time of this study. This was not the guideline used for this study.

Design

A descriptive experimental design was used. The data collection method was to check the patient's medical record at MAMC. From the entire population of diabetics over the age of 65, a random sample of 60 patients was selected. Although 60 records were reviewed, only 39 of those records could be used. These Records were not used for the following reasons: The patient was deceased, or the patient did not have 2 full years of data since the implementation of the clinical practice guideline.

Measures

Resource utilization was the measure of the guideline implementation. This was broken down into five resource utilization outcomes that were analyzed. They included emergency room visits, clinic visits, hospitalizations, total encounters, and health care encounter (Y/N). It was assumed that the guideline would provide a measure of success in these areas.

Patient Prescription Exercise Program/Phase II

Persons, Objects, Events: The sample size (n) for this set was 9 (n=9). One group of patients was followed. The group was the enrolled program participants. Of the total population, only 45 patients were in the program for 6 months or more. This is the population from which the sample was chosen.

Method

Design

A quasi experimental, one group pretest/posttest design, with some subjects receiving a long series of pretest observations to control for maturation and to control for threat to external validity, was used. The data collection method was from the database kept by the exercise program coordinator as well as the patients' medical record.

The enrolled population consisted of 79 patients. The final number of patients selected was 9 enrolled patients. These patients were followed for a 6-month period before and after the

intervention. The criterion used to select who would participate in the study also selected the study size. Patients had to have two complete SF-36s filled out in order to be included in the study. Since only 9 of the 45 patients returned the original SF-36, these were the patients used. A second SF-36 was administered to the patient and they became part of the sample.

Patient Information

In compiling the data, the researcher had access to personal information such as names and social security numbers as well as primary diagnoses. All materials and documents under review containing any personal information were maintained in a secure location. Disclosure of identities was not made, nor was identifiable patient information used. All cases were assigned an identification number, rendering the patient anonymous. Publication of this study did not disclose individual patient identification.

Site Location

Location of the exercise program was the Madigan Army Medical Center Keeler gymnasium. This site was selected for three reasons. The first reason was the proximity to the hospital. This is important from a safety and practical standpoint. Since the patient prescription exercise program coordinator was also a primary care physician in the hospital, it was logical to work close to the facility. Due to the age of the participants in the program, working within one mile of the

hospital lent to lower the risk involved in adverse outcomes from working with older patients. This was determined by the short amount of time it would take a patient to be transported to the hospital and be seen in the Emergency Room if needed.

The second issue was eligibility. Since all participants were either retired service members or dependants of active duty/retired service members, the use of the gym provided a no cost training facility for all eligible participants.

Lastly was the lack of availability of other facilities. There is no senior wellness center located on Fort Lewis. This brought in problems of availability. Since the post gyms are designated primarily to train active duty personnel, providing support to the TRICARE Senior Prime (TSP) program was on a space available basis. This is important to this study because of the added responsibility put on the MHS new laws passed with such programs as TSP and TRICARE For Life.

Eligibility

This program was originally designed to target the TSP population. Initial lack of awareness on the part of the providers led to slow start up and low numbers of initial referrals. To overcome this obstacle, and get the program off the ground, the program initially accepted everyone that was referred.

Certain criteria must have been met for a patient to be eligible for the program. The patients' primary care manager

(PCM) must have done an initial screening for admission to the program. Guidance that was provided to the PCM by the patient prescription exercise program coordinator consisted of only two items. The patient must be cleared by the PCM for the ability to withstand moderate exercise and the patient has to be motivated to participate in the program. With these criteria in mind, it was the PCM's subjective clinical opinion that created a referral to the program.

Program/Intervention

Dr. Joseph Dziados designed the program. Dr. Dziados was a primary care physician in the Family Practice Clinic at Madigan Army Medical Center. Dr. Dziados also acted as the sole patient prescription exercise program coordinator for the entire study. The program consisted of a three-phase approach after the referral by the patient's PCM.

The first phase of the program consisted of an initial counseling session between the patient prescription exercise program coordinator and the patient. This session was an initial screening of the medical history, acquiring informed consent from the participants, appendix B, and filling out of the SF 36, Health Survey, appendix C. After the initial paperwork was finished, a 1-hour didactic class was conducted to orient the patients to the program. This consisted of providing a work out sheet with the list of recommended exercises for each participant; See appendix D. Lastly, a one-on-one consultation with the patient was done to personalize the exercises the

patient would do for their time in the program.

The second phase of the program consisted of three 1-hour blocks of training on the equipment to be used. The first class concentrated on familiarizing the patient with all the aerobic exercise equipment as well as how it should be used. The second class focused on strength training and how and what machines should be used effectively. The last class consisted of flexibility training. This class was done by showing patients how to use their own body weight to improve health, as well as stretching exercises normally associated with flexibility.

After all training was conducted the patients were instructed to begin the program and provided with information on how to contact the patient prescription exercise program coordinator should additional training be needed, or if they had questions.

The last phase of the program was a retest at the 6-month point. This consisted of a follow up consultation and filling out another SF 36.

3. Results

Clinical Practice Guideline Evaluation/Phase I

Statistical Analysis

Baseline critical probability level was $\alpha = .05$.

Data sets were constructed for all data and are displayed in table 2.

Table 2 (Phase I data set)

ID	Well Managed (Y/N)	Hospitalizations	ER Visits	Clinic Visits	Total Encounters	Well Managed (Y/N)	Encounter (Y/N)
5	N	0	0	0	0	0	0
7	N	0	1	1	2	0	1
10	N	0	0	0	0	0	0
11	N	0	0	0	0	0	0
12	N	0	0	0	0	0	0
14	N	0	2	0	2	0	1
15	N	0	0	0	0	0	0
19	N	2	0	0	2	0	1
23	N	1	0	0	1	0	1
25	N	0	0	0	0	0	0
26	N	1	0	0	1	0	1
28	N	0	0	0	0	0	0
31	N	2	0	0	2	0	1
37	N	0	1	0	1	0	1
49	N	0	1	0	1	0	1
56	N	0	2	0	2	0	1
58	N	1	2	0	3	0	1
59	N	0	0	0	0	0	0
62	N	0	0	0	0	0	0
63	N	0	0	0	0	0	0
64	N	0	0	0	0	0	0
66	N	0	0	0	0	0	0
Subtotal for poorly managed patients		7	9	1	17	N/A	10

ID	Well Managed (Y/N)	Hospitalizations	ER Visits	Clinic Visits	Total Encounters	Well Managed (Y/N)	Encounter (Y/N)
4	Y	0	0	0	0	1	0
8	Y	0	1	1	2	1	1
9	Y	0	0	0	0	1	0
13	Y	0	0	0	0	1	0
16	Y	1	0	0	1	1	1
18	Y	0	0	0	0	1	0
20	Y	0	0	0	0	1	0
21	Y	0	0	0	0	1	0
22	Y	0	0	0	0	1	0
33	Y	0	0	0	0	1	0
34	Y	0	0	0	0	1	0
35	Y	0	0	0	0	1	0
36	Y	0	0	0	0	1	0
42	Y	0	0	0	0	1	0
48	Y	0	0	0	0	1	0
55	Y	0	0	0	0	1	0
61	Y	0	0	0	0	1	0
Subtotals for well managed patients		1	1	1	3	N/A	2
Totals		8	10	2	20		12

Descriptive statistics are shown in table 3 below. It shows the total number within the population, the means for all of the dependent variables as well as their standard deviations.

Table 3

Descriptive Statistics

	Mean	Standard Deviation	N (Population)
Y_1: Clinic Visits	0.0513	0.22	39
Y_2: Hospitalizations	0.21	0.52	39
Y_3: ER Visits	0.26	0.59	39
Y_4: Total Encounters	0.51	0.85	39
Y_5: Encounter (Y/N)	0.31	0.47	39
X: Well Managed Patient (Y/N)	0.44	0.5	39

Frequency distributions along with means and standard deviations are displayed in Table 4.

Table 4

Statistics

		Y1: Clinic Visits	Y2: Hospitalizations	Y3: ER Visits	Y4: Total Encounters	Y5: Encounter (Y/N)	X: Well Managed (Y/N)
N	Valid	39	39	39	39	39	39
	Missing	0	0	0	0	0	0
Standard Deviation		0.22	0.52	0.59	0.85	0.47	0.5
Variance		0.0499	0.27	0.35	0.73	0.22	0.25
Skewness		4.233	2.59	2.244	1.425	0.867	0.269
Kurtosis		16.779	6.043	3.919	0.782	-1.319	-2.035
Range		1	2	2	3	1	1
Minimum		0	0	0	0	0	0
Maximum		1	2	2	3	1	1

Table 4 expands the descriptive statistics to include the minimum and maximum. It also includes the total range for each variable.

The Kurtosis shows the peakedness or flatness of the graph of a frequency as compared with the normal distribution. It is a

measure of the extent to which observations cluster around a central point. This is important because a positive number next to Kurtosis indicates that the observations cluster more and have longer tails than those in a normal distribution. A normal Kurtosis statistic would be zero, looking at the table above, a rough idea of how each variable is compared to the normal distribution can be concluded.

The skewness shows the lack of symmetry in a frequency distribution. A normal distribution is symmetric with a value of zero. Looking at the table, an idea for where each variable is, compared to the normal distribution can be concluded.

Correlations were computed and displayed below.

Table 5

		Y_1: Clinic Visits	Y_2: Hospitalizations	Y_3: ER Visits	Y_4: Total Encounters	Y_5: Encounter (Y/N)	X: Well Managed (Y/N)
Y_1: Clinic Visits	Pearson Correlation	1.000	-0.093	0.295	.410**	.349*	0.030
	Significance (2-tailed)		0.575	0.069	0.010	0.030	0.856
	N	39	39	39	39	39	39
Y_2: Hospitaliz-ations	Pearson Correlation	-0.093	1.000	-0.004	.584**	.597**	-0.250
	Significance (2-tailed)	0.575		0.979	0.000	0.000	0.126
	N	39	39	39	39	39	39
Y_3: ER Visits	Pearson Correlation	0.295	-0.004	1.000	.770**	.655**	-0.296
	Significance (2-tailed)	0.069	0.979		0.000	0.000	0.067
	N	39	39	39	39	39	39
Y_4: Total Encounters	Pearson Correlation	.410**	.584**	.770**	1.000	.912**	-0.351
	Significance (2-tailed)	0.010	0.000	0.000		0.000	0.029
	N	39	39	39	39	39	39
Encounter (Y/N)	Pearson Correlation	.349*	.597**	.655**	.912**	1.000	-0.362
	Significance (2-tailed)	0.030	0.000	0.000	0.000		0.024
	N	39	39	39	39	39	39
Managed (Y/N)	Pearson Correlation	0.030	-0.250	-0.296	-0.351	-0.362	1.000
	Significance (2-tailed)	0.856	0.126	0.067	0.029	0.024	
	N	39	39	39	39	39	39

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

The Correlations table demonstrates the relationship between the variables. This is explained further in the discussion section, but an initial view reveals negative correlations exist showing that as the independent variable increases the dependent variable decreases.

Since the dependent variables are continuous, and the

independent variable is dichotomous, the independent t test (point biserial correlation) was used.

The computed test results were evaluated for statistical significance.

Table 6

Independent Samples Test

	t-test for equality of means					
					95% Confidence interval of the difference	
	t	df	significance (2-tailed)	Mean Differnece	Lower	Upper
Y_1: Clinic Visits	-0.18	32.094	0.858	-0.0134	-0.16	0.14
Y_2: Hospitalizations	1.731	28.125	0.094	0.26	-0.0475	0.57
Y_3: ER Visits	2.095	26.653	0.046	0.35	0.00698	0.69
Y_4: Total Encounters	2.446	33.667	0.02	0.6	0.1	1.09
Y_5: Encounters (Y/N)	2.491	36.11	0.017	0.34	0.0626	0.61

A narrative for results was written in the discussion section.

Lastly, using SPSS software, the exact level of significance was determined. Since only 3 of the 5 variables were statistically significant, the results in standard form for statistically significant results are:

Emergency Room Visits: t=2.095 (p=.046)

Total Encounters: t=2.446 (p=.020)

Encounters (Y/N): t=2.491 (p=.017)

Prescription Exercise Program/Phase II

Analysis of Data

Utilization of the medical facility was be the main measure of the program. Measures that were be used are emergency room visits, clinic visits, and hospitalizations.

Baseline critical probability level was $\alpha = .05$.

Data sets were created for all data; see table 7.

Table 7(Phase II data sets)

Date entered program	Age	ID	Pretest Hospitalizations	Pretest ER Visits	Pretest Clinic Visits	Pretest Total Encounters	Pretest Encounter (Y/N)
1-May-00	71	1	0	0	3	3	1
22-May-00	73	2	1	0	12	13	1
12-Jun-00	64	4	0	0	6	6	1
12-Jun-00	71	5	1	1	9	11	1
22-Sep-00	64	6	0	0	4	4	1
31-Jul-00	78	7	0	0	13	13	1
4-Aug-00	62	8	0	1	3	4	1
17-Aug-00	66	9	0	1	4	5	1
1-May-00	77	10	1	0	1	2	1
Sub totals for pretest			3	3	55	61	9

Date entered program	Age	ID	Posttest Hospitalizations	Posttest ER Visits	Posttest Clinic Visits	Posttest Total Encounters	Posttest Encounter (Y/N)
1-May-00	71	1	0	0	2	2	1
22-May-00	73	2	1	1	8	10	1
12-Jun-00	64	4	0	0	5	5	1
12-Jun-00	70	5	0	0	3	3	1
22-Sep-00	64	6	0	1	4	5	1
31-Jul-00	78	7	0	0	10	10	1
4-Aug-00	62	8	0	0	1	1	1
17-Aug-00	66	9	0	0	5	5	1
1-May-00	77	10	0	0	3	3	1
Sub total for posttest			1	2	41	44	9

Descriptive statistics

Frequency distributions for significant results are listed below.

Table 8

Crosstab

		Posttest Y_3: ER Visits		
		0	1	Total
Pretest Y_3:	0	4	2	6
ER Visits	1	3		3
Total		7	2	9

Table 9

Crosstab

		Posttest Y_2: Hospitalizations		
		0	1	Total
Pretest Y_2: Hospitalizations	0	6		6
	1	2	1	3
Total		8	1	9

The Crosstab tables above show the relationship of the significant variables when compared to themselves. Since the dependent variables were pre and post implementation, seeing the frequency of the ER Visits and Hospitalizations helps to show the downward trend of the variables after implementation of the exercise program.

Means and standard deviations are displayed below.

Table 10

Descriptive Statistics

	N	Minimum	Maximum	Mean	Standard Deviation
Age	9	62	78	69.44	5.83
Pretest Y_2: Hospitalizations	9	0	1	0.33	0.5
Pretest Y_3: ER Visits	9	0	1	0.33	0.5
Pretest Y_1: Clinic Visits	9	1	13	6.11	4.26
Pretest Y_4: Total Encounters	9	2	13	6.78	4.35
Posttest Y_2: Hospitalizations	9	0	1	0.11	0.33
Posttest Y_3: ER Visits	9	0	1	0.22	0.44
Posttest Y_1: Clinic Visits	9	1	10	4.56	2.88
Posttest Y_4: Total Encounters	9	1	10	4.89	3.22
Valid N (listwise)	9				

Correlations were computed and displayed below.

Table 11

		Pretest Y_1: Clinic Visits	Posttest Y_1: Clinic Visits	Pretest Y_2: Hospitaliz-ations	Posttest Y_2: Hospitaliz-ations	Pretest Y_3: ER Visits	Posttest Y_3: ER Visits	Pretest Y_4: Total Encounters	Posttest Y_4: Total Encounters
Pretest Y_1: Clinic Visits	Pearson Correlation	1.000	.821**	0.215	0.519	-0.137	0.252	.987**	.822**
	Significance (2-tailed)		0.007	0.578	0.152	0.725	0.514	0.000	0.007
	N	9	9	9	9	9	9	9	9
Posttest Y_1: Clinic Visits	Pearson Correlation	.821**	1.000	0.029	0.449	-0.405	0.285	.760*	.979**
	Significance (2-tailed)	0.007		0.941	0.225	0.279	0.458	0.018	0.000
	N	9	9	9	9	9	9	9	9
Pretest Y_2: Hospitaliz ations	Pearson Correlation	0.215	0.029	1.000	0.500	0.000	0.189	0.325	0.104
	Significance (2-tailed)	0.578	0.941		0.170	1.000	0.626	0.393	0.791
	N	9	9	9	9	9	9	9	9
Posttest Y_2: Hospitaliz ations	Pearson Correlation	0.519	0.449	0.500	1.000	-0.250	0.661	0.536	0.595
	Significance (2-tailed)	0.152	0.225	0.170		0.516	0.052	0.137	0.091
	N	9	9	9	9	9	9	9	9
Pretest Y_3: ER Visits	Pearson Correlation	-0.137	-0.405	0.000	-0.250	1.000	-0.378	-0.019	-0.440
	Significance (2-tailed)	0.725	0.279	1.000	0.516		0.316	0.961	0.236
	N	9	9	9	9	9	9	9	9
Posttest Y_3: ER Visits	Pearson Correlation	0.252	0.285	0.189	0.661	-0.378	1.000	0.224	0.460
	Significance (2-tailed)	0.514	0.458	0.626	0.025	0.316		0.562	0.213
	N	9	9	9	9	9	9	9	9
Pretest Y_4: Total Encounters	Pearson Correlation	.987**	.760*	0.325	0.536	-0.019	0.224	1.000	.765*
	Significance (2-tailed)	0.000	0.018	0.393	0.137	0.961	0.562		0.016
	N	9	9	9	9	9	9	9	9
Posttest Y_4: Total Encounters	Pearson Correlation	.822**	.979**	0.104	0.595	-0.440	0.460	.765*	1.000
	Significance (2-tailed)	0.007	0.000	0.791	0.091	0.236	0.213	0.016	
	N	9	9	9	9	9	9	9	9

*Correlation significant at the 0.05 level (2-tailed)
**Correlation significant at the 0.01 level (2-tailed)

Since the dependent variables are continuous, and the independent variable is dichotomous, the independent t test (point biserial correlation) was used.

Lastly, the results were written in standard form for statistically significant results. Since only 2 of the 4 variables were statistically significant, the results in standard form for statistically significant results are:

Clinic Visits: $t=4.750$ ($p=.001$)

Total Encounters: $t=4.556$ ($p=.002$)

A narrative for both descriptive and inferential results is covered in the discussion section.

4. Discussion.

Clinical Practice Guidelines/Phase I

From the correlations and t test for significance, table 6, it can be seen that CPGs must be looked at as a whole, not in its parts. When each of the variables is looked at separately, not all resources appear to be impacted. Looking at the Pearson Correlation reveals a figure of -.351 for variable Y_4: Total Encounters. This clearly shows that there is a negative correlation between managing a patient well, and total patient encounters. This means that the better a patient is managed the less resources will be used. From the analysis done, table 5, it can be seen that not only were total encounters significantly reduced, but whether they have an encounter at all (encounter y/n) was significantly reduced since a negative correlation exists between the dependent and independent variable.

The direction of the correlations in table 5 is consistent with the expected findings. The direction and magnitude of each of the variables show a significant relationship. Each dependent variable, except clinic visits, shows a negative correlation with the independent variable. As stated above, when all of the dependent variables are grouped together, Y_4, and compared to the independent variable we can clearly see a negative correlation.

From the t test for significance, it can be seen that the variables of most concern, total encounters and whether or not an encounter happens, show significant results. From this we can reject the null hypothesis and accept the alternate hypothesis.

Therefore, the effect of the independent variable upon the dependent variables is obvious. Since all patients are followed as a whole, being well managed lessens the utilization rate of each diabetic patient. From what has been seen, if a clinical practice guideline is followed, and patients are well managed, the amount of resources will be less. If we can apply this to the whole population, a dramatic thing happens. As we know, each patient visit incurs a cost. For each patient over the age of 65, a cost per visit can be calculated. The variables Y_1, Y_2, Y_3, and Y_4 can be determined by separating out the costs for patients seen at MAMC. The average cost of a clinic visit, Y_1, was determined to be $160.69. The average cost of a clinic visit for a patient over the age of 65 is determined by looking at the total costs for an adult patient seen at Madigan Army Medical Center and then stratifying these costs by age. The total costs

for an adult visit in Fiscal Year 2000 within the Adult Primary Care Clinic was $10,505,266. Total number of visits for all categories not separated by age were 66,486 total visits. The total number of visits for patients over 65 was 13,729. This accounts for a total of 21% of all adult visits to the clinic. This 21% can then be applied to the total costs of the clinic for a total of $2,206,106 for all clinic visits for patients over the age of 65. If this number is then divided by the total number of clinic visits for all over 65 patients, a cost per clinic visit, Y_1, of $160.69 is determined. This same formula was applied for the remaining variables for a per visit cost of $183.22 per ER visit, Y_3, and $999.24 per Hospitalization, Y_2. Summing all these variables to achieve total encounter costs, Y_4, is $1357.52. Since being well managed significantly lowers utilization, we see an immediate cost saving. The amount spent on developing the CPG is a sunk cost assumed by the corporation, U.S. Army Medical Command. This can translate into direct savings for the MTF. From Table 2, we can see that if a patient is poorly managed, they have higher total encounters. Of the possible 100% of patients seen, 43% of poorly managed patients have an encounter, as opposed to only 3% if the patient is well managed. At the time of this study, there were 1062 diabetics over the age of 65. If the costs for total encounters, Y_4, were applied to population, a cost of $1,441,686.20 is incurred if 100% of the patients are seen. However, if patients are poorly managed, 43% of them will be seen for a cost of $619,925.06. If they are well managed, only 3% of them will be seen for a cost

of $43,250.59. For the Madigan Army Medical Center, this savings translates to approximately, $576,674.47.

In all of these formulas, the average costs of a visit for a patient over the age of 65 was to number used. At the time of this study, due to constraints, a further breakdown, to get exact costs for diabetic patients, was not possible. An average cost for a patient over the age of 65 was used to give the reader an idea of the cost savings that may be achieved if the CPG is implemented.

Patient Prescription Exercise Program/Phase II

The effect of the independent variable upon the dependent variables is significant. The results of the sample analysis can be generalized to the entire eligible population to determine the implications of implementing a prescription exercise program.

From a small population, a small sample was taken. This was a convenience sample. Each of the 9 patients studied were chosen due to their participation in a health survey.

From two significant variables a trend towards being healthier can be seen. The patients were compared against themselves for a 6-month period before and after the implementation of the program. They became their own control group. Some of the variables could not be examined as they occurred in all patients and rendered them useless. Encounters (Y/N), is one of these variables. Since all of the patients had an encounter in the 6 months before the intervention and at least one encounter after the intervention, no significant

results could have been drawn and the variable was not used.

Since clinic visits and total encounters produced significant results they can be looked at closer. The mean number of clinic visits before the intervention was 6.11 for the sample. After the intervention, 4.56 was the mean. Since the significance was there for both the pre-implementation visit and the post-implementation visit, it can be deduced that participating in the exercise program helped to reduce the utilization of enrolled patients. This can also be seen in total encounters. Since total encounters represent all health care encounters, total encounters is a valid variable to use to determine if an intervention would help on a larger scale. For both the pre and post intervention, total encounters were significant. From this it can be concluded that participation in the exercise program can directly effect how often a person sees their health care provider. Therefore, the null hypothesis can be rejected, and the alternate hypothesis can be accepted.

How does this affect us administratively? For each patient visit, a cost is incurred. Total costs for all variables can be totaled to get the cost for total encounters, Y_4, of $1,357.52. Once the cost for total encounters is determined, the results of the study can be applied. Since the results were significant, immediate cost savings to the MTF could be seen. The total costs per patient could drop from $9203.99, with no exercise program, to $6638.27. This shows cost savings of $2565.72 per patient, per year if they are involved in a patient prescription exercise

program.

5. Conclusions and Recommendations.

Clinical Practice Guidelines/Phase I

It cannot be disputed that a patient must be well managed to be effectively cared for. From this analysis, it is clear that there is a high potential for significantly positive results. Implementation of CPGs as well as utilizing them is clearly the best choice, clinically and administratively, to care for the patient. Taken separately, following the CPGs may not affect one of the variables in a patient's health. Taken as a whole, however, it can be seen that if CPGs are used and a patient is well managed, we can reduce the number of over all unexpected hospitalizations, clinic visits, and ER Visits.

Some things noted during this study were telling of the care received. Not all patient records are the same. It became evident rather quickly that some providers are very good at utilizing the CPG for diabetes for patients while others were not. Not all providers used diabetic flow sheets to accurately care for their patients. Providers utilizing the flow sheet were usually accurate with the care prescribed within the CPG. However, when the patient had a prevailing medical issue, some of the items that are prescribed in the guideline were not done. The most overlooked requirement within the guideline was monofiliment testing for neuropathy.

Along these same lines, if the patient had another medical condition that was more pressing to the provider, usually the CPG care fell by the wayside. For instance, if the patient had

hypertension that was life threatening and took most of the health care encounters, treatment of the patient for diabetes became secondary. This was evident in the detail in the patient record about the encounter for hypertension, with diabetes being noted only as co-morbidity within the initial situation summary.

Some things should be realized when reading this study. Due to the limited time frame, and its nature as a retrospective study, this should only be used as a pilot to begin further work in this area. A prospective study, to follow patients who are being well managed would be the next logical step. Since the results were statistically significant, a need to further pursue studies on CPGs would be vital.

Patient Prescription Exercise Program/Phase II

Obviously, with the introduction of new benefits for our over 65 retiree population, caring for these patients is not slowing or going away. The Department of Defense is committed to caring for these beneficiaries. One of the ways to improve the care they are provided is to insure their health. To do this, a preventive step must be taken. One method could be the introduction of a patient prescription exercise program. From an administrative standpoint, expansion of this program should continue. Along with expansion, continued study is needed.

A prospective study, looking at a larger sample and following patients for 1 year before beginning the program and for 1 year during the program would improve on this project. This would provide validation for this project, as well as help

to determine how far this program should be expanded.

Bringing both phases together to benefit the entire over 65 years of age beneficiary population, as well as the organization as a whole, was the intent behind this study. Utilizing every method to keep the patient healthy that is at our discretion is what should be done. This can include implementing clinical practice guidelines to keep patients already suffering from a specific illness healthier, as well as trying new methods of keeping patients from developing acute, and chronic illnesses by such methods as a prescription exercise program. Making and keeping patients at their optimum health status should be the overreaching goal of any practice or intervention. Clearly, the significant results of this study, both Phase I and II, show that this can be accomplished.

References

AmeriStat (2000). The Aging of the United States. Retrieved October, 5 2000 from the World Wide Web: http://www.ameristat.org/estproj/aging.htm

Araki, A., Ito, H. (1999). Perspective of Dietary Management and Exercise Therapy in Diabetes Mellitus. Japanese Journal of Clinical Medicine, 57 (3), 650-656.

Aucott, J., Pelecanos, E., Dombrowski, R., Fuehrer, S., Laich, J., Aron, D. (1996). Implementation of Local Guidelines for Cost-Effective Management of Hypertension: A Trial of the Firm System. Journal of General Internal Medicine, 11 (3), 139-146.

Belardinelli, R., Georgiou, D., Cianci, G., Purcaro, A. (1999). Randomized, Controlled Trial of Long-Term Moderate Exercise Training in Chronic Heart Failure: Effects on Functional Capacity, Quality of Life, and Clinical Outcome. Circulation, 99 (9), 1173-1182.

Department of Defense (OSH/HA) (2000). What is TRICARE?. Retrieved October, 17 2000 from the World Wide Web: http://www.tricare.osd.mil/tricare/beneficiary/whatistricare.html

Department of Defense (OSH/HA) (2000). What is TRICARE Senior Prime?. Retrieved March 23, 2001 from the World Wide Web: http://www.tricare.osd.mil/tricare/beneficiary/SeniorPrime.html

Franz, M., Splett, P., Monk, A., Barry, B., McClain, K., Weaver, T., Upham, P., Bergenstal, R., Mazze, R. (1995). Cost-Effectiveness of Medical Nutrition Therapy Provided By Dietitians for Persons With Non-Insulin-Dependent Diabetes Mellitus. Journal of the American Dietetic Association, 95 (9), 1018-1024.

Fries, J., Koop, C.E., Beadle, C., Carson, E., Cooper, P., England, M.J., Greaves, R., Sokolov, J., Wright, D., Health Project Consortium (1993). Reducing Health Care Costs by Reducing the Need and Demand for Medical Services. New England Journal of Medicine, 329 (5), 321-325.

Kavanagh, T., Myers, M., Baigrie, R., Mertens, D., Sawyer, P., Shephard, R. (1996). Quality of Life and Cardiorespiratory Function in Chronic Heart Failure: Effects of 12 Months' Aerobic Training. Heart, 76 (1), 42-49.

Lorig, K., Mazonson, P., Holman, H. (1993). Evidence Suggesting That Health Education for Self-Management in Patients With Chronic Arthritis Has Sustained Health Benefits While Reducing Health Care Costs. Arthritis & Rheumatism, 36 (4), 439-446.

Madigan Army Medical Center (1998, October). MADIGAN ARMY MEDICAL Standards of Medical Care for Adult Patients with Diabetes Mellitus. Retrieved October 5, 2000 from the World Wide Web: http://192.138.33.222/dmr/standards/Clin_stand/diabetes.htm

MEDCOM (U. S. Army Medical Command) (1999). Top 20 # 13 Implementation of Practice Guidelines. Dolter, K.

Meltzer, S., Leiter, L., Daneman, D., Gerstein, H., Lau, D., Ludwig, S., Yale, J., Zinman, B., Lillie, D. (1998). 1998 Clinical Practice Guidelines for the Management of Diabetes in Canada. Canadian Medical Association Journal, 159 (8S), 1S-29S.

Mitchell, J. (2000). Guideline implementation in the Department of Defense. Chest, 118 (2S), 65s-69s.

Munro, J., Brazier, J., Davey, R., Nicholl, J. (1997). Physical Activity For the Over-65s: Could It be a Cost-Effective Exercise for the NHS? Journal of Public Health Medicine, 19 (4), 397-402.

Power, E., Eisenberg, J. (1998). Are We Ready to Use Cost-Effectiveness Analysis in Health Care Decision-Making?: A Health Services Research Challenge for Clinicians, Patients, Health Care Systems, and Public Policy. Medical Care, 36 (5s), MS10-MS17.

Rohrbach, J. (1999). Critical Pathways as an Essential Part of a Disease Management Program. Journal of Nursing Care Quality, 14 (1), 11-15.

Saint, S., Scholes, D., Fihn, S., Farrell, R., Stamm, W. (1999). The Effectiveness of a Clinical Practice Guideline for the Management of Presumed Uncomplicated Urinary Tract Infection in Women. The American Journal of Medicine, 106 (6), 636-641.

Shephard, R. (1993). Exercise and Aging: Extending Independence in Older Adults. Geriatrics, 48 (5), 61-64.

Stedman, T. (2000). Stedman's Medical Dictionary (27th ed.). Baltimore, MD: Lippincott Williams & Wilkins.

Stross, J. (1999). Guidelines have their limits. Annals of Internal Medicine, 131 (4), 304-306.

Sultz, H., Young, K. (1999). Financing Health Care. In D. Coursey (Ed.), Health Care USA: Understanding Its Organization and Delivery (2nd ed., pp. 207-209). Gaithersville, Maryland: Aspen Publishers.

Veterans Health Affairs/Department of Defense (1999). VHA/DOD Clinical Practice Guideline for the Management of Diabetes Mellitus in the Primary Care Setting [Guideline].

[redacted]
Hits Since Apr 00

I. **TITLE: MADIGAN ARMY MEDICAL Standards of Medical Care for the Adult Patient with**

II. **INDICATIONS FOR THE STANDARD:** Diabetes mellitus is a common disease with high morbidity and mortality. It adversely affects multiple organ systems. Diabetes accounts for 15% of annual acute health care expenditures and the cost of management increases as glycemic control decreases. Meticulous control of diabetes reduces long-term diabetic complications *Complications*. A standardized approach to diabetic care is critical in the management of these patients. The American Diabetes Association (ADA) and other groups have developed guidelines that have been adopted for use at Madigan Army Medical Center (MAMC).

III. **METRICS THAT WILL BE USED TO MONITOR ADHERENCE TO THE ADULT PATI**

The metrics cited below are a subset of the clinical practice standards *(Section VIII below)* that have been developed to encourage good diabetic care. Non-medical personnel will use one or more of the metrics to conduct random chart audits to assess compliance with the management standard. Audits will be limited to any visit focusing on diabetic care.

Health record entries or a chart summary sheet will reflect concurrence with each of the following metrics:

Primary Care Emphasis

Name of the primary care manager OR evidence of referral to Foundation Health for assistance in finding a PCM.

History

Discussion of the role of self-monitoring of blood glucose (SMBG) documented, at each visit.

Notation of frequency and severity of hypoglycemia, at each visit.

Physical Exam
Weight and blood pressure, at each visit.
Referral to Ophthalmology for a dilated retinal examination, at a minimum annually.
Foot examination including monofilament screening for neuropathy, at a minimum every six months.
Laboratory
Hemoglobin A1c (HbA1c) or glycated hemoglobin (GHb), at a minimum annually.
Annual fasting lipid profile, serum creatinine, and urinalysis (UA), at a minimum annually.
Thyroid stimulating hormone (TSH), at a minimum every three years.
Therapy
Referral to Nutrition Care **AND** Diabetic Nurse Educator, at any time.
Evidence of an adjustment to therapy if the HbA1c or GHb is greater than two percentage points (2%)

IV. **DATE OF PATHWAY COMPLETION**: Initial version 28 January 1998; revision 23 October 1998.

V. **AUTHORS:**

COL Daniel Knodel, Endocrine Service

LTC Curtis Hobbs, Endocrine Service

MAJ (P) Richard Jordan, Adult Primary Care Clinic

MAJ Scott Carter, Family Practice

Point of Contact: Chief, MAMC Endocrine Service

Phone: 968-0438

FAX: 968-0448
VI. AREAS OF DISAGREEMENT: None.

VII. **RELATED PUBLISHED STANDARDS OF CARE:** American Diabetes Association: Clinical Practice Recommendations, MAMC Pharmacy Guidelines, MAMC Referral Guidelines.

VIII. **CLINICAL PRACTICE RECOMMENDATION:** The clinical practice recommendations liste The recommendations may be divided as follows:

Diagnosis and Classification

History

Physical Examination

Laboratory Evaluation

Therapeutic Recommendations

Guidelines for Self-Monitored Blood Glucose(SMBG)

IX. **IMPACT TO THE INSTITUTION:** These clinical practice recommendations impact many areas of the hospital and all providers who care for patients with diabetes. This includes all of the primary care areas, Ophthalmology, the Foot at Risk Clinic, and the Endocrinology Service.

X. **ELECTRONIC LINKS:** All of the clinical practice recommendations and this overview will be published on the MAMC Intranet under the heading of Standards of Medical Care for Adult Patients with Diabetes Mellitus. A reminder field in CHCS will alert the provider to the standards whenever the provider prescribes insulin or an oral hypoglycemic agent. The standards will also be published on the CHCS Bulletin Board. Appropriate hypertext links will be used.

XI. **METHODS OF PROVIDER EDUCATION:** Annually, inservices will be conducted to discuss these guidelines. Department and Service Chiefs will emphasize their use. These guidelines will be integrated into graduate medical education (GME).

The clinical practice recommendations for diabetes should be available when a patient is being evaluated to encourage their use.

XII. **REVISION FREQUENCY:** These pathways will be reviewed annually by the Clinical Standards Committee. Major revisions should be required infrequently.

Standards of Medical Care for Adult Patients with Diabetes Mellitus: Diagnosis and Classification

Diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. Symptoms of hyperglycemia include polyuria, polydipsia, weight loss, polyphagia, and blurred vision. Acute, life-threatening consequences of diabetes include ketoacidosis and the nonketotic hyperosmolar syndrome. Long-term consequences of diabetes include retinopathy with potential loss of vision; nephropathy leading to renal failure; peripheral neuropathy with risk of foot ulcers, amputation, and Charcot joints; and autonomic neuropathy causing gastrointestinal, genitourinary, cardiovascular symptoms and sexual dysfunction. Diabetics have an increased incidence of atherosclerotic cardiovascular, peripheral vascular, and cerebrovascular disease, as well as hypertension, hyperlipidemia, and biliary and periodontal disease.

CLASSIFICATION

Assigning a type of diabetes to an individual often depends on the circumstances present at the time of diagnosis. Many patients do not easily fit into a single class. It is less important to label the particular type of diabetes than it is to understand the pathophysiology of the diabetes and treat it effectively.

The terms insulin-dependent diabetes (IDDM) and non-insulin-dependent diabetes (NIDDM) are imprecise and should not be used. The following classification is appropriate:

Type 1 diabetes. Due to beta-cell destruction and usually leads to absolute insulin deficiency.

Type 2 diabetes. Widely variable, ranging from marked insulin resistance with relative insulin deficiency to mild insulin resistance with a significant defect in insulin secretion.

Diabetes due to monogenetic defects in beta-cell function. Examples include maturity-onset diabetes of youth (MODY) and impaired conversion of proinsulin to insulin.

Diabetes due to specific defects in insulin action. Examples include leprechaunism and Rabson-Mendenhall syndrome.

Diabetes due to disorders of the exocrine pancreas. Examples include pancreatitis and pancreatectomy.

Diabetes associated with other endocrinopathies. Examples include Cushing's syndrome and acromegaly.

Gestational diabetes (GDM).

DIAGNOSTIC CRITERIA FOR DIABETES

The revised criteria for the diagnosis of diabetes appear in the table below:

Criteria for the Diagnosis of Diabetes Mellitus

1. Symptoms of diabetes plus casual glucose concentration of greater or equal to 200 mg/dl. Casual is defined as any time of day without regard to time since last meal. Symptoms of diabetes include polyuria, polydipsia, weight loss, polyphagia, and blurred vision.
2. A fasting plasma glucose (FPG) with values on two separate occasions of greater than or equal to 126 mg/dl. Fasting is defined as no caloric intake for at least 8 hours.
3. A 2-hour plasma glucose greater than or equal to 200 mg/dl during a 75 gram oral glucose tolerance test (OGTT). This test is not recommended for routine use.

A patient is considered to have **impaired fasting glucose** (IFG) if the plasma glucose is greater than or equal to 110 mg/dl but less than 126 mg/dl. A patient is considered to have **impaired glucose tolerance** (IGT) if the plasma glucose following a 75-g OGTT is greater than or equal to 140 mg/dl but less than 200 mg/dl.

Standards of Medical Care for Adult Patients with Diabetes Mellitus: History

Diabetes mellitus is associated with numerous complications involving many organ systems. Often, these complications are apparent from the history and physical exam. The metrics that will be used to evaluate compliance with practice recommendations for the evaluation of diabetic patients are as follows:

INITIAL VISIT WITH PRIMARY CARE MANAGER (Comprehensive History)

Symptoms related to diabetes or its long-term complications

Summary of pertinent labs {link to Labs} and hemoglobin A1c (HbA1c) or glycated hemoglobin (GHb) results

Eating patterns, nutritional status, and weight history

Current management including medications and meal plan

Activity and exercise habits

Self-monitored blood glucose (SMBG) habits and results

Frequency and severity of hyper- and hypoglycemia and diabetic ketoacidosis (DKA)

Details of prior education by Nutrition Care and Diabetic Nurse Educators

Family history

Family planning, birth control, and preconception care

Gestational history with emphasis on gestational diabetes, infant weight of > 9 lb, toxemia, stillbirth, or polyhydramnios

Atherosclerotic risk factors including tobacco, obesity, and lipids

History of prior infections including oral, GU system, skin, and feet

Date and results of last dental examination

Status of immunizations, particularly tetanus, influenza, and pneumococcal

Lifestyle, cultural, economic, or educational factors bearing on management

FOLLOW-UP VISIT BY ANY PROVIDER RENDERING DIABETIC CARE (Interim History)

Current medications and other therapies

Adjustments by the patient to the therapeutic regimen

Status of other illnesses or chronic conditions

Changes in lifestyle or psychosocial situation

Analysis of the response to treatment with an emphasis on the results of SMBG and the frequency, causes, and severity of hyper- and hypoglycemia

Symptoms suggesting development of the complications of diabetes

Standards of Medical Care for Adult Patients with Diabetes Mellitus: Physical Exam

Diabetes mellitus is associated with numerous complications involving many organ systems. Often, these complications are apparent from the history and physical exam. The metrics that will be used to evaluate compliance with practice recommendations for the evaluation of diabetic patients are as follows:

INITIAL VISIT WITH PRIMARY CARE MANAGER (Comprehensive PE)

Height, weight, and blood pressure

Results of dilated eye exam by Ophthalmology or Optometry or documentation of referral for same

Oral exam

Thyroid exam

Cardiac exam

Abdominal exam (e.g., bruits, hepatomegaly)

Evaluation of pulses

Foot exam (taking note of lesions, skin and nail changes, and architectural changes)

Skin exam (including injection sites)

Neurologic exam (including examination of feet with monofilament)

FOLLOW-UP VISIT BY ANY PROVIDER RENDERING DIABETIC CARE (Focused PE)

Follow up examinations should include all clinically indicated portions of the physical exam but the following will be done in all patients with diabetes:

Weight and blood pressure

Foot exam (taking note of lesions, skin and nail changes, and architectural changes)

All diabetics will be referred to either Ophthalmology or Optometry for a dilated retinal examination by on an annual basis.

Standards of Medical Care for Adult Patients with Diabetes Mellitus: Laboratory Evaluation

In the management of diabetes, the laboratory evaluation is used to assess diabetic control, identify some such as nephropathy, and detect commonly associated d
INITIAL VISIT WITH PRIMARY CARE MANAGER
The initial laboratory tests indicated in the evaluation of the diabetic patient are:

Fasting plasma glucose

Hemoglobin A1c (HbA1c) or glycated hemoglobin (GHb)

Fasting lipid profile to include total cholesterol, HDL cholesterol, triglycerides, and calculated LDL cholesterol

Serum creatinine

Urinalysis (UA)

If the UA is negative for protein, a microalbumin test should be ordered:

In any type 2 diabetic

In any type 1 diabetic with a duration of diabetes greater than 5 years

This study correlates with nephropathy and coronary artery disease

Thyroid stimulating hormone (TSH) unless done within the previous 3 years

Electrocardiogram

FOLLOW-UP VISIT BY ANY PROVIDER RENDERING DIABETES-SPECIFIC CARE

In the patient receiving ongoing care for diabetes, the laboratory assessment will be dictated by clinical circumstances, e.g., UA in the patient complaining of urinary frequency and dysuria. The following laboratories are considered the minimal dataset necessary to render acceptable care:

HbA1c or GHb, quarterly

Lipid profile, annually

UA, annually

If the UA is negative for protein, a microalbumin test should be ordered on an annual basis:

In any type 2 diabetic
In any type 1 diabetic with a duration of diabetes greater than 5 years
If the UA is positive for protein, a urine protein/creatinine ratio should be calculated on an annual basis
TSH unless done within the previous 3 years
Serum creatinine and other serum chemistries as indicated, annually

Department of Pharmacy

Prescribing Guidelines

The following prescribing guidelines have been endorsed by the Madigan Army Medical Center Pharmacy and Therapeutics Committ These guidelines serve as an education tool for the use of medications i treatment of specific disease states. While general prescribing guideli be written, not every patient will fit these guidelines. It should be stres that the Guidelines are only that, guidelines. The ultimate judgment regarding the appropriateness of any specific therapy must be made b physician in light of all circumstances presented by an individual patie

GUIDELINES

- Antibiotics (Oral)
- Allergic Rhinitis
- COPD
- GERD
- Helicobacter pylori
- Hyperlipidemia
- Hypertension
- Low Molecular Weight Heparin
- Metformin
- NSAIDs
- Onychomycosis
- Post-Menopausal Osteoporosis
- SSRIs
- Sildenafil

LINKS

- Pharmacy Home Page
- MAMC Home Page

Send mail to Pharmacy Pagemaster with questions or comments about this web site.

Last modified: January 04, 2000

Standards of Medical Care for Adult Patients with Diabetes Mellitus: Guidelines for Self-Monitored Blood Glucose (SMBG)

REASONS TO PRESCRIBE SMBG

Virtually all patients with diabetes should perform SMBG because doing so promotes improved glycemic control and reinforces adherence to therapy. Specific reasons to prescribe SMBG include:

To achieve or maintain a specific level of glycemic control.

To prevent and detect hypoglycemia.

To avoid severe hyperglycemia.

To adjust care in response to changes in pharmacologic therapy or lifestyle.

The frequency of SMBG varies considerably and depends upon the complexity of the therapy and the clinical situation of the patient.

RECOMMENDED FREQUENCY OF SMBG

SMBG monitoring is of no value unless both patient and provider use the information generated to assess glycemic control and adjust therapy accordingly. These guidelines include an algorithm {*link to algorithm*} that can be used to determine the frequency and timing of SMBG. Establishment of patient-specific targets of glycemic control is a prerequisite to recommending SMBG. The American Diabetic Association (ADA) recommends the following parameters:

INDEX OF CONTROL	NORMAL	GOAL	ACTION SUGGESTED
Preprandial glucose	< 110 mg/dl	80-120 mg/dl	< 80 or > 140
Bedtime glucose	< 120	100-140	< 100 or > 160
Postprandial (1.5-2h)		< 180	> 200
HbA1c	Normal range	< 1% above upper limit of normal	> 2% above upper limit of normal

PRESCRIBING SMBG

SMBG will only be prescribed by a patient's Primary Care Manager (PCM). Glucose test strips will be issued by a patient's primary care portal. Glucose test strips will be provided based on the intent of SMBG:

INTENT OF SMBG	SMBG PRESCRIPTION
Determine if patient's glycemic control is within targeted parameters	SMBG up to four times per week, once or twice per day, ongoing
Troubleshoot poor glycemic control prior to adjusting therapy in the conventionally-treated patient	SMBG daily, once to four times per day, for a period not to exceed one month
Troubleshoot poor glycemic control prior to initiating intensive insulin therapy with multiple daily injections or continuous subcutaneous insulin infusion	SMBG daily, four to seven times per day, for a period not to exceed one month
Manage the patient on intensive insulin therapy	SMBG daily, four to seven times per day, ongoing

NATURAL HISTORY OF IDDM

The most frequent complication of type 1 diabetes is retinopathy. The cumulative incidence is 90%; proliferative retinopathy develops at a rate of 3% per year after ten years of diabetes. The incidence of nephropathy peaks during the second decade of disease at a rate of 3% per year; cumulative incidence is twenty percent. The prevalence of coronary artery disease is 50% by age 55. Neuropathy will develop in at least half of all diabetics within 25 years of diagnosis. Numerous other potential complications and coexistent conditions are possible to include hypertension. Three-fourths of diabetics have GI symptoms (constipation 60%, pain 34%, N&V 29%, diarrhea 22%, incontinence 20%). Motility is abnormal in 42% of Type 1 patients and 30% of Type 2 patients. Manometry is abnormal in 56% of all diabetics - the percentage increases to 86% if peripheral neuropathy is evident clinically. Gastroesophageal reflux disease (GERD) is probably not increased, though Candida infections are increased.

IMPACT OF INTENSIVE DIABETIC THERAPY

Data from the Diabetes Control and Complications Trial (DCCT), the Wisconsin Epidemiologic Study of Diabetic Retinopathy (WESDR), and the Stockholm Diabetes Intervention Study (SDIS) show that intensive diabetic therapy leads to an overall 60 percent reduction in the risk for microvascular complications compared to usual treatment. In the DCCT, the mean HbA1c of intensively treated patients was 7.2%, whereas the conventionally treated group had a mean HbA1c of 8.9%. The value of careful glycemic control was as follows:

DIABETIC COMPLICATION	PERCENT REDUCTION
New retinopathy	76%
Progression of existing retinopathy	54%
Development of proliferative retinopathy	47%
Gross proteinuria	54%
Clinical neuropathy	60%
Hypercholesterolemia	34%
Cardiovascular & peripheral vascular events	41%

CONSENT FOR PERFORMANCE OF TREATMENT, PROCEDURE, ANESTHESIA AND/OR BLOOD PRODUCTS

(For use of this form, see MAMC Regulation 40-110; the proponent agency is the Deputy Commander for Clinical Services.)

Washington State law guarantees that you have both the right and obligation to make decisions concerning your health care. Your Health Care Provider (HCP) will provide you with the necessary information and advice, but as a member of the health care team, you must enter into the decision making process. This form has been designed to document this process of informed consent, and for you to acknowledge your acceptance of treatment by your provider.

TREATMENT OR PROCEDURE:

THIS PROCEDURE WILL BE PERFORMED BY:

DESCRIPTION OF THE NATURE/RISKS:

Your signature below indicates you have agreed to consent as described in each portion of the form. If you do not agree with a particular statement, please line through the statement and initial.

My HCP has answered all my questions. I understand I am free to withhold or withdraw consent at any time.

I understand that the expected results of the above stated treatment/procedure cannot be guaranteed. My HCP(s) at Madigan Army Medical Center (MAMC) has (have) discussed, to my satisfaction, the following as they relate to the treatment or procedure:

- **The nature and character**
- **The anticipated results**
- **The recognized alternatives, including no treatment**
- **The recognized serious risks and complications**
- **The anticipated date and time**

I consent to the administration of blood and blood products if deemed medically necessary. I understand that all blood and blood products involve the risk of allergic reaction, fever, hives, and in rare circumstances infectious diseases such as hepatitis and HIV/AIDS. I understand that precautions are taken by the blood bank in screening donors and in matching blood for transfusion to minimize those risks.

I consent to the observation of this treatment/procedure by MAMC HCP(s) and authorized staff.

I consent to the disposal of any tissues or parts which may be necessary to remove.

I consent to the appropriate administration of anesthesia as may be considered necessary or advisable in the judgement of the HCP(s).

I consent to the performance of the treatment/procedure as detailed above and of such additional treatments or procedures as are found to be necessary or desirable, during the course of the treatment/procedure, in the judgement of the HCP(s).

I consent to the taking of medical photographs and/or video recordings of this procedure, understanding that this is for medical education/learning and that they may be viewed by various personnel undergoing training/ education. It is understood that identifying information, to include names, will not be used to identify the medical photo, and that the photos/videos will be used for purposes of furthering medical/dental education only.

By signing, I certify that this form has been fully explained to me, and that I have read it or have had it read to me, that the form is fully filled out and that I understand its contents.

PATIENT SIGNATURE *(Or other legally responsible party - include relationship if not patient)*	HEALTH CARE PROVIDER		
WITNESS SIGNATURE *(Excludes OR Team)*	DATE	TIME	INTERPRETER USED ☐ Yes

PATIENT IDENTIFICATION *(For typed or written entries give: Name (last, first, middle), grade, date, hospital or medical facility.)*

[redacted] FUNCTIONAL HEALTH STATUS QUESTIONNAIRE Page 1

Draft

MADIGAN army MEDICAL CENTER

CM Id | Patient ID | Today's Date:

Darken circles like this: ●

Not like this: ○

Type of Survey

PRINT inside the boxes like this

1 2 3 4 5 6 7 8 9

● Initial ○ Followup1 ○ Followup2 ○ Followup3 ○ Followup4 ○ Discharge

1. In general, would you say your health is:

○ Excellent ○ Very good ○ Good ○ Fair ○ Poor

2. Compared to one year ago, how would you rate your health in general now?

○ Much better ○ Better ○ About the same ○ Worse ○ Much worse

3. The following items are about activities you might do during a typical day
Does your health now limit you in these activities?
If so, how much?

	Limited a lot	Limited a little	Not at all
a. Vigorous activities: running, lifting heavy objects, participating in strenuous activities	○	○	○
b. Moderate activities: moving a table, pushing a vacuum cleaner, bowling, or playing golf	○	○	○
c. Lifting or carrying groceries	○	○	○
d. Climbing several flights of stairs	○	○	○
e. Climbing one flight of stairs	○	○	○
f. Bending, kneeling, or stooping	○	○	○
g. Walking more than a mile	○	○	○
h. Walking several blocks	○	○	○
i. Walking one block	○	○	○
j. Bathing or dressing yourself	○	○	○

4. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

	Yes	No
a. cut down on the amount of time you spend on work or other activies	○	○
b. Accomplished less than you would like	○	○
c. Were limited in the kind of work or other activities	○	○
d. Had difficulty performing the work or other activities (for example, it took extra effort)	○	○

5. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

	Yes	No
a. Cut down on the amount of time you spend on work or other activities	○	○
b. Accomplished less than you would like	○	○
c. Didn't do work or other activities as carefully as usual	○	○

Draft

Clinic Id | Patient ID | Today's Date

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6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?

O Not at all O Slightly O Moderately O Quite a bit O Extremely

7. How much bodily pain have you had during the past 4 weeks?

O None O Very mild O Mild O Moderate O Severe O Very severe

8. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

O Not at all O A little bit O Moderately O Quite a bit O Extremely

9. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks

	All of the time	Most of the time	A good bit of the time	Some of the time	A little of the time	None of the time
a. Did you feel full of pep?	O	O	O	O	O	O
b. Have you been a very nervous person?	O	O	O	O	O	O
c. Have you felt so down in the dumps that nothing could cheer you up?	O	O	O	O	O	O
d. Have you felt calm and peaceful?	O	O	O	O	O	O
e. Did you have a lot of energy?	O	O	O	O	O	O
f. Have you felt downhearted and blue?	O	O	O	O	O	O
g. Did you feel worn out?	O	O	O	O	O	O
h. Have you been a happy person?	O	O	O	O	O	O
i. Did you feel tired?	O	O	O	O	O	O

10. During the past 4 weeks, how much of the time has your physical health or emotional problems interferred with your social activities (like visiting friends, relatives, etc.)?

O All of the time O Most of the time O Some of the time O A little of the time O None of the time

11. How TRUE or FALSE is each of the following statements for you?

	Definitely true	Mostly true	Don't know	Mostly false	Definitely false
a. I seem to get sick a little easier than other people	O	O	O	O	O
b. I am as healthy as anybody I know	O	O	O	O	O
c. I expect my health to get worse	O	O	O	O	O
d. My health is excellent	O	O	O	O	O

Thank you for your participation in this survey!

AEROBIC PRESCRIPTION

LOW FITNESS (Minimum requirement for health benefit)

30 minutes 3-5 days per week of moderate intensity (55-65 percent heart rate maximum) activities. You may break up the 30 minutes into three 10-minute periods of activity. You are encouraged to gradually increase the intensity and duration of exercise and move into the high fitness prescription level.

HIGH FITNESS (Greater intensity for more health benefit)

20-60 minutes 3-5 days per week of higher intensity (70-90 percent heart rate maximum) exercise. May break up the time into 10-minute exercise periods, which are non-continuos throughout the day.

STRENGTH PRESCRIPTION

LOW FITNESS (Minimum for functional benefit)

1 set of 10 repetition maximum (RM) squats two days per week, preferably with own body weight as the resistance. You are encouraged to gradually increase the volume and variety of exercise to include the remainder of the body, and move to higher fitness.

High Fitness (Increased functional benefit)

2 sets of 10RM upper body pushes, pulls, abdominal, back, and lower extremity exercises 2 days per week.

AEROBIC EXERCISE SELECTIONS

Walking	Bicycling	Stair Climbing	Rowing
Running	Swimming	Nordic Track	Step Aerobics
Skating	Kick Board	Snow Shoeing	Dancing

EQUIVELANT STRENTGTH EXERCISE SELECTIONS

	FREE WEIGHTS	MACHINE WEIGHTS	BODY WEIGHT
UPPER BODY PUSH			
UP TO HEAD	Overhead Press	Overhead Press	Handstand Pushup
DOWN TO FEET	Decline Bench	Graviton, Multipurpose Nautilus	Dip
RIGHT ANGLE	Bench Press	Bench Press	Pushup
UPPERBODY PULL			
UP TO HEAD	Upright Row	Cable Upright Row	No Equivalent
DOWN TO FEET	No Equivalent	Lat Pulldown	Pullup
RIGHT ANGLE	Bent-over Row	Seated Row	No Equivalent
ABS	Weighted Situp	Resisted Crunch	Situp, Crunch, L-Seat, Slant Board, Roman Chair
BACK	Straight Leg Deadlift, Good Mornings	Bent Over T-Bar Row, Back Extension	Roman Chair Prone Hyperextension
LEGS	Squat, Lunge, Deadlift	Leg Press, Sled/Hack Squat	One-Leg Squat